

### Claims

1. A multipotent neural stem cell substantially purified from skin of a postnatal mammal.

2. The multipotent neural stem cell of claim 1, wherein said skin tissue  
5 comprises the dermal and epidermal layers.

3. The multipotent neural stem cell of claim 1, wherein said peripheral tissue is from an adult mammal.

4. The multipotent neural stem cell of claim 1, wherein said peripheral tissue is from a juvenile mammal.

10 5. The multipotent neural stem cell of claim 1, wherein said mammal is a human.

6. The multipotent neural stem cell of claim 1, wherein said cell expresses nestin.

15 7. The multipotent neural stem cell of claim 1, which under appropriate conditions can be differentiated into a neuron, an astrocyte, a Schwann cell, or an oligodendrocyte.

8. The multipotent neural stem cell of claim 1, which can be differentiated into a non-neural cell.

9. The multipotent neural stem cell of claim 1, wherein said cell contains a heterologous gene in an expressible genetic construction.

10. The multipotent neural stem cell of claim 9, wherein said gene encodes a therapeutic protein.

5           11. The multipotent neural stem cell of claim 9, wherein said gene encodes a cell fate-determining protein.

12. A population of at least ten cells, wherein at least 30% of the cells are multipotent neural stem cells substantially purified from skin of a postnatal mammal.

10           13. The population of cells of claim 12, wherein said peripheral tissue is from a human.

14. A pharmaceutical composition comprising (i) a multipotent neural stem cell substantially purified from skin of a postnatal mammal, and (ii) a pharmaceutically acceptable carrier, auxiliary or excipient.

15           15. A cell aggregate comprising at least ten multipotent neural stem cells derived from skin of a mammal, said multipotent neural stem cells capable of differentiating as dopaminergic neurons.

16. The aggregate of claim 15, wherein said cells grow detached from

the culture substrate.

17. The aggregate of claim 15, wherein said aggregate comprises at least one hundred multipotent neural stem cells derived from skin of a mammal.

5 *See 21* 18. A method of producing a population of at least ten cells, wherein at least 30% of the cells are multipotent neural stem cells substantially purified from skin of a postnatal mammal, or progeny of said multipotent neural stem cells, said method comprising the steps of:

(a) providing said skin from said mammal;

10 (b) culturing said skin under conditions in which multipotent neural stem cells proliferate and in which at least 25% of the cells that are not multipotent neural stem cells die or attach to the culture substrate; and

(c) continuing culture step (b) until at least 30% of the cells are multipotent neural stem cells or progeny of said multipotent neural stem cells.

15 19. A method of producing a population of at least ten cells, wherein at least 30% of the cells are multipotent neural stem cells substantially purified from skin of a postnatal mammal or progeny of said multipotent neural stem cells, said method comprising the steps of:

(a) providing said skin from said mammal;

20 (b) culturing said skin under conditions in which multipotent neural stem cells proliferate and in which at least 25% of the cells that are not multipotent neural stem cells die or attach to the culture substrate;

(c) separating said multipotent neural stem cells from said cells that

attach to said culture substrate; and

(d) repeating steps (b) and (c) until at least 30% of the cells are

multipotent neural stem cells or progeny of said multipotent neural stem cells.

5 20. The method of claim 19, wherein said population is at least one hundred cells.

21. A multipotent neural stem cell in the central nervous system of a mammal, said neural stem cell produced by a method of comprising the step of transplanting a multipotent neural stem cell substantially purified from the skin of a mammal into the central nervous system of said mammal.

10 22. The multipotent neural stem cell of claim 21, wherein said mammal from which said cell is substantially purified is said mammal into which said cell is transplanted.

23. The multipotent neural stem cell of claim 21, wherein said mammal from which said cell is substantially purified is immunologically similar to said  
15 mammal into which said cell is transplanted.

24. A kit comprising a multipotent neural stem cell substantially purified from skin of a postnatal mammal.

25. The kit of claim 24, said kit comprising a population of cells, wherein at least 30% of said cells are multipotent neural stem cells substantially

purified from said skin.

26. A kit for the substantial purification of multipotent neural stem cells from skin of a postnatal mammal.

27. A method of treating a patient having a disease characterized by failure of a cell type, said method comprising administering to said patient a multipotent neural stem cell derived from a peripheral tissue, said neural stem cell capable of producing neurons and glia.

28. The method of claim 27, wherein said peripheral tissue is skin.

29. A kit for use in performing the method of claim 27.

30. A method for treating a patient having a disease characterized by failure of a cell type, said method comprising administering to said patient a differentiated cell that is the progeny of a multipotent neural stem cell derived from a peripheral tissue.

31. The method of claim 30, wherein said peripheral tissue is skin.

32. A method for making a neuron that expresses dopamine, said method comprising the steps of:

- (a) providing a multipotent neural stem cell derived from skin; and
- (b) culturing said cell under conditions whereby said cell differentiates

into a neuron that expresses dopamine.

33. A method for making a cell other than a skin cell, said method comprising the step of culturing a multipotent neural stem cell substantially purified from skin of a postnatal mammal under conditions in which said cell
- 5 differentiates as a cell other than a skin cell.

34. The method of claim 33, wherein said cell is a neuron, a glial cell, a cardiac cell, or an pancreatic islet cell.

Add a<sup>2</sup>